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**INJURY**  
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# Do psychological factors influence pain following a fracture of the extremities?

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## Abstract

We studied the role of psychological factors on pain following a fracture of the extremities in older adults ( $n = 111$ ) using a prospective design. Pain and psychological variables measured at baseline, postfracture anxiety and depression, and demographic variables were used to predict pain two months after the fracture. Both moderately severe and serious fractures lead to an increase in pain. Pain at baseline and postinjury anxiety were associated with pain following a fracture of the extremities. © 1999 Elsevier Science Ltd. All rights reserved.

## 1. Introduction

Fractures of the extremities occur commonly in the elderly population, and have a considerable impact on patients' subsequent functional capacity, state of dependency and ability to live in the community [1]. Patients with such fractures may also suffer a great deal of pain [2]. Research suggests that pain is affected by psychological factors. For instance, postoperative pain in surgical patients is associated with preoperative anxiety [3], postoperative anxiety [4] and neuroticism [5]. Psychological variables also play a part in the development of chronic forms of pain. For example, Dworkin et al. [6] found that anxiety and disease conviction during the acute phase of herpes zoster were predictors of chronic herpes zoster pain.

The present study was conducted to examine the relationship between psychological variables and pain following a fracture of the extremities in elderly

patients. Based on research with surgical and herpes zoster patients, we expected that anxiety and neuroticism would show an association with postfracture pain.

## 2. Methods

### 2.1. Patients

This investigation is part of a longitudinal aging study on functional status and well-being in the elderly. Baseline data on 5279 community-dwelling older adults ( $\geq 57$  years) living in the northern parts of The Netherlands were collected in 1993. Participants who sustained a fracture of the extremities after the baseline, were invited for an interview approximately two months postfracture. By the end of 1996, 111 patients with fractures of the extremities had been studied. Our sample consisted of 75 patients with relatively mild injuries (e.g. wrist and ankle fractures) and 36 with serious injury (i.e. hip fracture).

### 2.2. Dependent measure

Postinjury pain was selected as the dependent

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Table 1  
Association between the independent variables and pain two months postinjury (dependent variable)

Independent variable	$\beta$	<i>p</i> -value
Age	−0.13	0.15
Sex	0.07	0.45
Education	−0.02	0.80
Religiosity	−0.14	0.10
Extraversion	0.05	0.57
Neuroticism	−0.14	0.10
Anxiety at baseline	0.11	0.30
Depression at baseline	0.07	0.44
Social support	−0.13	0.16
Perceived control	0.13	0.16
Self confidence	0.13	0.15
Pain at baseline	0.29	0.00
Anxiety two months postinjury	0.21	0.02
Depression two months postinjury	0.08	0.43

variable. Patients were administered the subscale ‘bodily pain’ from the Dutch version of the MOS Short-Form General Health Survey (SF-20) [7], both at baseline and 2 months postfracture.

### 2.3. Independent measures

We used a range of independent variables: (a) age at two months postfracture, (b) sex, education, religiosity, extroversion and neuroticism, anxiety, depression, social support, perceived control (over the environment) and self-confidence measured at baseline, (c) anxiety and depression measured two months following injury. Religiosity was measured with a five-point scale (1 = very religious, 5 = antireligious). The Dutch version of Eysenck’s Personality Questionnaire — Revised [8] was used to assess extroversion and neuroticism. Anxiety and depression were measured with the Dutch version of the Hospital Anxiety Depression Scale [9]. We used the SSL12-I [10] to determine levels of social support. Perceived control was assessed with a scale developed by Pearlin and Schooler [11]. Self-confidence was measured with the Dutch version of Sherer’s scale [12].

### 2.4. Data analysis

First, we used a paired *t*-test to determine whether — in the total sample — mean postfracture level of pain was higher than baseline level. Next, increase in pain between the two patient groups was compared using a *t*-test. Finally, forward stepwise linear multiple regression was used to find out if any of the independent variables contributed to postfracture pain score.

## 3. Results and discussion

Mean (S.D.) age of the patients was 72.0 (8.0) years. Mean (S.D.) pain score was 31.3 (30.4) at baseline and 38.5 (30.0) postfracture ( $t(110) = 2.18$ ,  $p < 0.05$ ). Mean (S.D.) increase in pain was 9.7 (34.6) for patients with moderately severe fractures and 2.1 (35.0) for those with serious injury ( $t(109) = 0.28$ , ns). Table 1 shows the association between the independent variables and the dependent variable. There were two significant predictors of pain score two months postinjury: pain at baseline and postfracture level of anxiety. The other variables were not associated with pain measured two months postinjury.

The results can easily be summarized. Elderly patients experience more pain after a fracture of the extremities. Moreover, fractures of the wrist or ankle (moderately severe injuries) seem to cause as much pain as hip fractures (a serious fracture). Baseline level of pain is associated with pain following injury to the extremities. Psychological factors — with the exception of postfracture level of anxiety — do not play a role in pain after a fracture of the extremities.

It is difficult to tell whether postfracture pain is affected by anxiety or vice versa. In surgical patients, preoperative anxiety does influence postoperative level of pain [3]. It is therefore possible that pain in patients with injury to the extremities is — at least to a certain degree — influenced by level of anxiety. This could have implications for clinical practice. Reducing anxiety in patients with fractures of the extremities, for instance with relaxation training, may also lower their level of pain. Future research is indicated to shed more light on the effect of anxiety reduction on pain following injury to the extremities.

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